Student ID# __________________  M/F  Age ____  Hgt ______  Wgt ______

Nutrition Labs
Dr. J. Lim

PART ONE: Basal Metabolic Rate
Calculating Daily Energy Required for Basal Metabolic Rate
Basal metabolism is the minimum amount of energy the body needs at rest in the fasting state. The basal metabolic rate (BMR) is the rate at which kcal are spent for these at rest activities that maintain life such as the beating of the heart, breathing, maintaining body temperature, and sending nerve impulses.

Factors affecting BMR
BMR varies according to a person’s sex, age, and amount of body surface area.
- **Body style**: a tall, thin person has a higher BMR than a short, stout person
- **Age**: the younger the person, the more likely it is that cell division is occurring; therefore, BMR is higher for younger persons than for older persons
- **Sex**: males have a higher BMR than females because males have a greater percentage of muscle tissue

The experimental procedure for calculating BMR takes all these factors into consideration.

EXPERIMENTAL PROCEDURE
1. Use the bathroom scale and measuring stick to determine your weight and height. It is assumed that you are fully clothed and wearing shoes with a 1-inch heel. Be honest about your weight. There is no need to tell anyone else.
2. Body Surface Area. Use the data you have just collected and Table 1 to determine your body surface area. Using a straight edge, draw a straight line from your height to your weight. The point where that line crosses the middle column shows your surface area in square meters. For example, a person who is 6 ft tall and weighs 170 lbs has a body surface area of 1.99 square meters.

What is your body surface area? _______________________

3. Hourly BMR. Use Table 2 to find the BMR constant for your age and sex. Multiply your surface area by this factor to calculate your BMR/hr. For example, a 17-year old male has a BMR constant of 41.5kcal/m2hr. If his surface area is 1.99m2, his BMR is 82.6kcal/hr.

What is your BMR/hr? _______________________

4. Daily BMR. Multiply your hourly rate by 24 to obtain the total number of kcal you need for BMR/day. For example, if the BMR is 82.6kcal/hr, then the daily BMR rate is 1,982kcal/day.

What is your BMR/day? _________________
Table 1
Nomogram to estimate body surface area from height and weight.
A straight line is drawn from the subject's height (Scale 1) to the subject's weight (Scale 3). The point at which the line intersects Scale 2 is the subject's body surface area in m² (meters squared).
Compare your results with one of these two online BMR calculators:
http://www.mistupid.com/fitness/bmr.htm
How do your calculations compare with the online value?

PART TWO: Assessing Your Personal Fitness Level
In this exercise you will determine your personal fitness level based upon body mass and fat measurements using BMI guidelines set by the World Health Organization (WHO) and body fat recommendations are from the American Journal of Clinical Nutrition.

Measuring BMI & Body Fat Percentage:
• Determine your weight and height using the bathroom scale and wall height chart
• Wash and dry your hands before handling the measuring device
• Set personal data on Omron Body Fat Analyzer before taking measurements
  Set the following data points
  o guest
  o normal or serious athlete
  o height (1/4 inch increments)
  o weight in pounds
  o age
  o gender

<table>
<thead>
<tr>
<th>Age</th>
<th>Males</th>
<th>Females</th>
<th>Age</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>47.7</td>
<td>44.9</td>
<td>29</td>
<td>37.7</td>
<td>35.0</td>
</tr>
<tr>
<td>11</td>
<td>46.5</td>
<td>43.5</td>
<td>30</td>
<td>37.6</td>
<td>35.0</td>
</tr>
<tr>
<td>12</td>
<td>45.3</td>
<td>42.0</td>
<td>31</td>
<td>37.4</td>
<td>35.0</td>
</tr>
<tr>
<td>13</td>
<td>44.5</td>
<td>40.5</td>
<td>32</td>
<td>37.2</td>
<td>34.9</td>
</tr>
<tr>
<td>14</td>
<td>43.8</td>
<td>39.2</td>
<td>33</td>
<td>37.1</td>
<td>34.9</td>
</tr>
<tr>
<td>15</td>
<td>42.9</td>
<td>38.3</td>
<td>34</td>
<td>37.0</td>
<td>34.9</td>
</tr>
<tr>
<td>16</td>
<td>42.0</td>
<td>37.2</td>
<td>35</td>
<td>36.9</td>
<td>34.8</td>
</tr>
<tr>
<td>17</td>
<td>41.5</td>
<td>36.4</td>
<td>36</td>
<td>36.8</td>
<td>34.7</td>
</tr>
<tr>
<td>18</td>
<td>40.8</td>
<td>35.8</td>
<td>37</td>
<td>36.7</td>
<td>34.6</td>
</tr>
<tr>
<td>19</td>
<td>40.5</td>
<td>35.4</td>
<td>38</td>
<td>36.7</td>
<td>34.5</td>
</tr>
<tr>
<td>20</td>
<td>39.9</td>
<td>35.3</td>
<td>39</td>
<td>36.6</td>
<td>34.4</td>
</tr>
<tr>
<td>21</td>
<td>39.5</td>
<td>35.2</td>
<td>40–44</td>
<td>36.4</td>
<td>34.1</td>
</tr>
<tr>
<td>22</td>
<td>39.2</td>
<td>35.2</td>
<td>45–49</td>
<td>36.2</td>
<td>33.8</td>
</tr>
<tr>
<td>23</td>
<td>39.0</td>
<td>35.2</td>
<td>50–54</td>
<td>35.8</td>
<td>33.1</td>
</tr>
<tr>
<td>24</td>
<td>38.7</td>
<td>35.1</td>
<td>55–59</td>
<td>35.1</td>
<td>32.8</td>
</tr>
<tr>
<td>25</td>
<td>38.4</td>
<td>35.1</td>
<td>60–64</td>
<td>34.5</td>
<td>32.0</td>
</tr>
<tr>
<td>26</td>
<td>38.2</td>
<td>35.0</td>
<td>65–69</td>
<td>33.5</td>
<td>31.6</td>
</tr>
<tr>
<td>27</td>
<td>38.0</td>
<td>35.0</td>
<td>70–74</td>
<td>32.7</td>
<td>31.1</td>
</tr>
<tr>
<td>28</td>
<td>37.8</td>
<td>35.0</td>
<td>75+</td>
<td>31.8</td>
<td></td>
</tr>
</tbody>
</table>
NOTE: These recommendations are for informational purposes only and should not be considered or used as medical guidelines for weight loss, exercise, or dietary changes. Always consult with your physician before beginning any weight loss or exercise program or when making changes to your diet.

**Background Information:** The Omron HBF-306 Body Fat Analyzer displays the estimated value of body fat percentage by the Biomedical Impedance (BI) method and indicates the body mass in four ranges of LOW, NORMAL, HIGH, and VERY HIGH according to the BMI value.

The Biomedical Impedance method passes a safe, low-level electrical signal through the body. It is difficult for the signal to flow through fat in the human body, but easy to flow through moisture in the muscle and other body tissues. The difficulty with which a signal flows through a substance is called impedance. So the amount of fat in the body can be accurately estimated by measuring the impedance. The signal used is very low-level, making it safe and imperceptible.

Body Mass Index (BMI) is an internationally used index to show the body condition by checking the balance between the height and the weight. It is calculated by using the following formula:

**Body Mass Index** = (weight (lbs) X 703 / height (in) / height (in))

**BMI in metric** = weight (kg) / height (m) / height (m)
How to Interpret the Results

Body fat percentage
Displays the body fat mass as the percentage of body weight.

BMI classification
Displays LOW, NORMAL, HIGH, or VERY HIGH.

BMI
BMI is an internationally used index to show the body condition by checking the balance between the height and the weight. It is calculated by the following formula:

BMI: Body Mass Index = (weight (lbs) x 703) / height (in) / height (in)
BMI in metric = weight (kg) / height (m) / height (m)

Recommended Body Fat Ranges and BMI

<table>
<thead>
<tr>
<th>Age</th>
<th>Low (BMI &lt; 18.5)</th>
<th>Recommended (BMI 18.5-24.9)</th>
<th>High (BMI 25-29.9)</th>
<th>Very High (BMI &gt; 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-39</td>
<td>5-20</td>
<td>21-33</td>
<td>34-38</td>
<td>&gt;38</td>
</tr>
<tr>
<td>40-59</td>
<td>5-22</td>
<td>23-34</td>
<td>35-40</td>
<td>&gt;40</td>
</tr>
<tr>
<td>60-79</td>
<td>5-23</td>
<td>24-36</td>
<td>37-41</td>
<td>&gt;41</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-39</td>
<td>5-7</td>
<td>8-20</td>
<td>21-25</td>
<td>&gt;25</td>
</tr>
<tr>
<td>40-59</td>
<td>5-10</td>
<td>11-21</td>
<td>22-27</td>
<td>&gt;27</td>
</tr>
<tr>
<td>60-79</td>
<td>5-12</td>
<td>13-25</td>
<td>26-30</td>
<td>&gt;30</td>
</tr>
</tbody>
</table>

Based on NIH/WHO guidelines for BMI

<table>
<thead>
<tr>
<th>BMI (Designation by the WHO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 18.5 (Low)</td>
</tr>
<tr>
<td>18.5 or more and less than 25 (Normal)</td>
</tr>
<tr>
<td>25 or more and less than 30 (Pre-obese)</td>
</tr>
<tr>
<td>30 or more (Obesity)</td>
</tr>
</tbody>
</table>

The above-mentioned indices refer to the values for obesity judgment proposed by the WHO, the World Health Organization.

Follow the directions above to attain your personal readings

Your Body Fat _____%  Your BMI _________

PART THREE: MyPyramid Tracker

MyPyramid Tracker is an online dietary and physical activity assessment tool that provides information on your diet quality, physical activity status, related nutrition messages, and links to nutrient and physical activity information. The Food
Calories/Energy Balance feature automatically calculates your energy balance by subtracting the energy you expend from physical activity from your food calories/energy intake. Use of this tool helps you better understand your energy balance status and enhances the link between good nutrition and regular physical activity.

The following will lead you to the detailed directions on the website. Please follow those instructions carefully:

1. log on to www.mypyramid.gov
2. Near the middle of the page on the right column above the astronaut cartoon you find MyPyramid tracker
   - Click Go here
3. At the bottom of the next page click register or log in if returning
4. Complete personal profile and hit Save Today’s Changes if needed
5. Enter and complete section entitled Proceed to Food Intake
   - Enter food item, search, select best match and add to foods eaten list
     i. Include all meals and snacks for a given day
   - Be sure to Select Quantity for all food items
   - don’t forget water and other beverages
   - Save and Analyze after the day’s food intake is recorded
   - On the Analyze Your Food Intake page:
     i. Calculate and print your:
        1. Dietary Guidelines (DG) Comparison
        2. Nutrient Intakes from foods
        3. MyPyramid statistics
6. Proceed to Physical Activity Entry page
   - Select the Standard option
   - Select/Search activity type and add to Daily Activities list
     i. Don’t forget sleeping, driving, multiple household chores, sitting in class, studying, and walking from place to place
   - Select Duration of each activity
   - Save and Analyze results after the day’s physical activity is recorded
   - Click Analyze to reach the Analyze Your Physical Activity page
   - Go to Calculate Your Physical Activity Score
     i. Print your Physical Activity Results
       1. SKIP Physical Activity History
7. Proceed to Energy Balance page
   - View and print your Energy Balance Summary
8. Submitted report should include copies of :
   - Food Intake ➔ DG Comparison, Nutrient Intake & MyPyramid stats
   - Physical Activity ➔ Physical Activity Results
   - Energy Balance Summary

PART FOUR: Food Label Analysis
Examine the U.S. Food and Drug Administration (FDA) publication entitled “How to Understand and Use the Nutrition Facts Label” from either the class website at www.ccsf.edu/jllim or the www.cfsan.fda.gov/~dms/foodlab.html
Next, use this information to scrutinize the label on a unit of packaged food from your cupboard at home. Take notes on the following aspects of your food selection:

- Serving size
- Calories
- Total fat
- Saturated fat
- Unsaturated fat
- Trans fat
- Cholesterol
- Sodium
- Total Carbohydrate
- Dietary fiber
- Sugars
- Protein
- Vitamin A
- Vitamin C
- Calcium
- Iron

Food Label REPORT
List the good and bad aspects of your chosen food followed by a discussion of its nutritional value. If possible, include the actual label or a copy of it. Should that be difficult, just record the “Nutrition Facts.”

PART FIVE: Personal Health and Fitness Summary
Citing your readings for BMR, Fat %, BMI, and your MyPyramid Energy Balance (food intake versus physical activity) Summary plus utilizing your knowledge of food labels, describe your presumed state of health and fitness. What is likely to occur if the current trend continues over the next twenty-years? What changes (if any) in diet and/or physical activity would better your chances of a long and healthy life?